State Performance-Based Regulation Using Multiyear Rate Plans for U.S. Electric Utilities

Mark Newton Lowry, president, Pacific Economics Group Research LLC
Lisa Schwartz, Berkeley Lab

Lawrence Berkeley National Laboratory
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By Mark Newton Lowry, Matthew Makos and Jeff Deason
Project manager and technical editor: Lisa Schwartz
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About the authors

- **Mark Newton Lowry**, lead author and our presenter today, is President of Pacific Economics Group (PEG) Research LLC. He has been active in the field of performance-based regulation since the 1990s, doing research, consultation and expert witness testimony on multiyear rate plans, productivity, benchmarking and revenue decoupling. A former Pennsylvania State University energy economics professor, he holds a Ph.D. in applied economics from the University of Wisconsin.
- **Matt Makos** is a Consultant II at PEG Research LLC. Over the past 10 years he has played a leading role in the gathering, appraisal and documentation of precedents for performance-based regulation and other alternatives to traditional utility regulation. He holds a bachelor's degree in business administration from the University of Wisconsin.
- **Jeff Deason** is a Program Manager in the Electricity Markets and Policy Group at Berkeley Lab. He focuses on energy efficiency research and technical assistance projects in the areas of policy, program design, implementation and evaluation. He is in the final stages of a Ph.D. program in public policy at University of California, Berkeley, where he completed degrees in resource economics and behavioral economics.

Study Part of DOE's Grid Modernization Initiative: Future Electric Utility Regulation project (1)

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Project Description

Provide technical assistance and analysis for public utility commissions (PUCs) and a series of reports with multiple perspectives on evolving utility regulation and ratemaking, utility business models and electricity markets:

- Adapting to new technologies and services
- Assessing potential financial impacts on utility shareholders and customers
- Engaging consumers
- Addressing utility incentives to achieve grid modernization goals

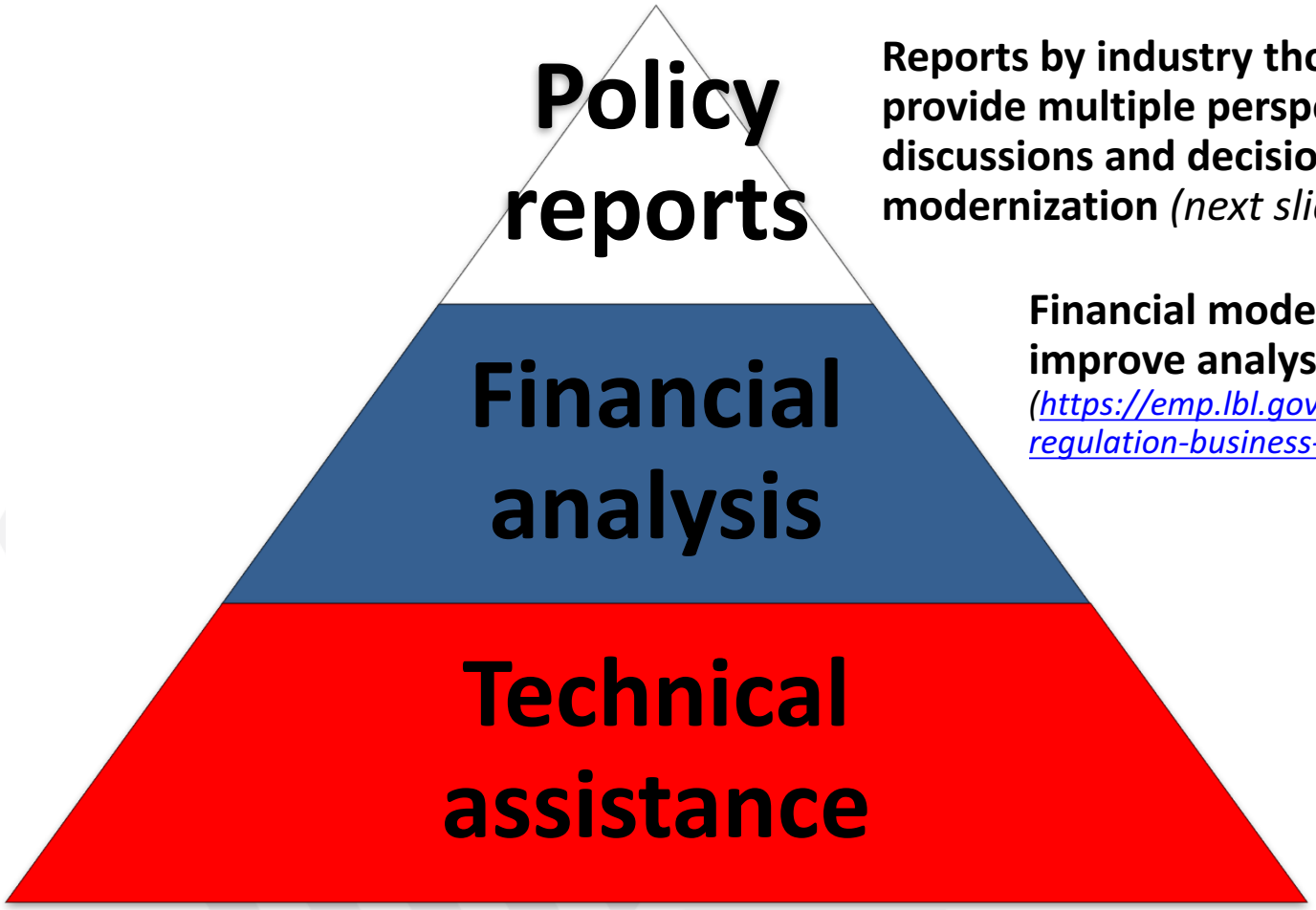
Value Proposition

- ✓ Modernizing grids requires utilities to make large investments in the face of rapid change and increasing risk and uncertainty.
- ✓ This project helps PUCs and utilities explore regulatory changes to deploy needed capital.

Project Objectives

- ✓ States will have improved capability to consider alternative regulatory and ratemaking approaches to enable grid modernization investments.
- ✓ Approaches will better tie utility earnings to consumer value, economic efficiency, and other policy goals.
- ✓ Ultimately, states will provide utilities with regulatory guidance and incentives to efficiently deploy capital to achieve grid modernization goals.

Future Electric Utility Regulation project (2)



Reports by industry thought-leaders provide multiple perspectives to inform discussions and decision-making on grid modernization *(next slides)*

Financial modeling tools to improve analyses and decisions *(https://emp.lbl.gov/research/utility-regulation-business-models)*

Technical assistance to states to provide requested expertise and resources on incremental and more fundamental regulatory changes *(today's webinar)*

Future Electric Utility Regulation report series (1)

GRID MODERNIZATION LABORATORY CONSORTIUM
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- A series of reports from Berkeley Lab taps leading thinkers to grapple with complex regulatory issues for electricity
- Multi-perspective approach provides different views on future of electric utility regulation and business models and achieving a reliable, affordable, and flexible power system to inform ongoing discussion and debate
- Expert advisory group provides guidance and review *(additional slides)*
- Funded by DOE Office of Electricity Delivery and Energy Reliability - Electricity Policy Technical Assistance Program and Office of Energy Efficiency and Renewable Energy's Solar Energy Technologies Office

FUTURE ELECTRIC
Utility Regulation

Future Electric Utility Regulation report series (2)

GRID MODERNIZATION LABORATORY CONSORTIUM
U.S. Department of Energy

1. Distributed Energy Resources (DERs), Industry Structure and Regulatory Responses
2. Distribution Systems in a High DER Future: Planning, Market Design, Operation and Oversight
3. Performance-Based Regulation in a High DER Future
4. Distribution System Pricing With DERs
5. Recovery of Utility Fixed Costs: Utility, Consumer, Environmental and Economist Perspectives
6. The Future of Electricity Resource Planning
7. The Future of Centrally-Organized Wholesale Electricity Markets
8. Regulatory Incentives and Disincentives for Utility Investments in Grid Modernization
9. Value-Added Electricity Services: New Roles for Utilities and Third-Party Providers (underway)

- Additional reports forthcoming: **feur.lbl.gov**

Webinar housekeeping items

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- We're recording the webinar and will post it on our web site.
- Because of the large number of participants, everyone is in listen mode only.
- Please use the chat box to send us your questions and comments any time during the webinar.
- The lead report author will present for about 30 minutes.
- Moderated Q&A will follow, with the report author responding to questions typed in the chat box.
- The report is posted at https://emp.lbl.gov/publications/state-performance-based-regulation. Webinar slides will be posted at this link next week.

Introduction

- Performance-based regulation (PBR) is a popular alternative to cost of service regulation (COSR) of electric utilities
- Berkeley Lab has previously published on this topic, including:
  - Comnes et al., *Performance-Based Regulation for Electric Utilities* (1995)
  - Lowry and Woolf, *Performance-Based Regulation for a High Distributed Energy Resources Future* (2016)
- Berkeley Lab retained Pacific Economics Group (PEG) Research LLC to lead a study and technical report that drills down on the multiyear rate plan (MRP) approach to PBR.

Multiyear Rate Plans for U.S. Electric Utilities: Report Objectives

Broaden understanding of MRPs and their uses in electric utility regulation

- Rationale for MRPs in today's business environment
- Key plan design challenges
- MRP case studies
- Impact of MRPs on utility cost performance
  - Incentive Power Model
  - Empirical research on power distributor productivity trends
    - Productivity trends reported for individual utilities and full U.S. sample

MRP Case Studies in LBNL Report

7 case studies

- Central Maine Power: operated for 18 years under MRPs with extensive marketing flexibility
- MidAmerican Energy: operated for 17 years under MRPs
- California: longstanding practitioner of MRPs with demand-side management (DSM) incentives
- New York: longstanding MRP practitioner is developing “utility of the future” regulations in REV proceeding
- Extended (e.g., 12+ years) informal U.S. rate stayouts
- Ontario: longstanding, innovative Canadian MRP leader
- Britain: “RIIO” approach to MRP design has garnered U.S. attention

Cost of Service Regulation

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Modern COSR

- Base rates adjusted in general rate cases
- Trackers, once reserved for energy procurement expenses, are increasingly used to address other costs (e.g., capital)
- Usage (e.g., volumetric and demand) charges collect revenue for many “fixed” costs

COSR Challenges

- Utility performance incentives and regulatory cost vary with business conditions (e.g., inflation)
- When conditions are *favorable*, rate cases are infrequent so regulatory cost is low and performance incentives are strong
- Chronically adverse business conditions trigger frequent rate cases and more expansive cost trackers that can raise regulatory cost and weaken performance incentives
- Performance can deteriorate just when good performance is most needed

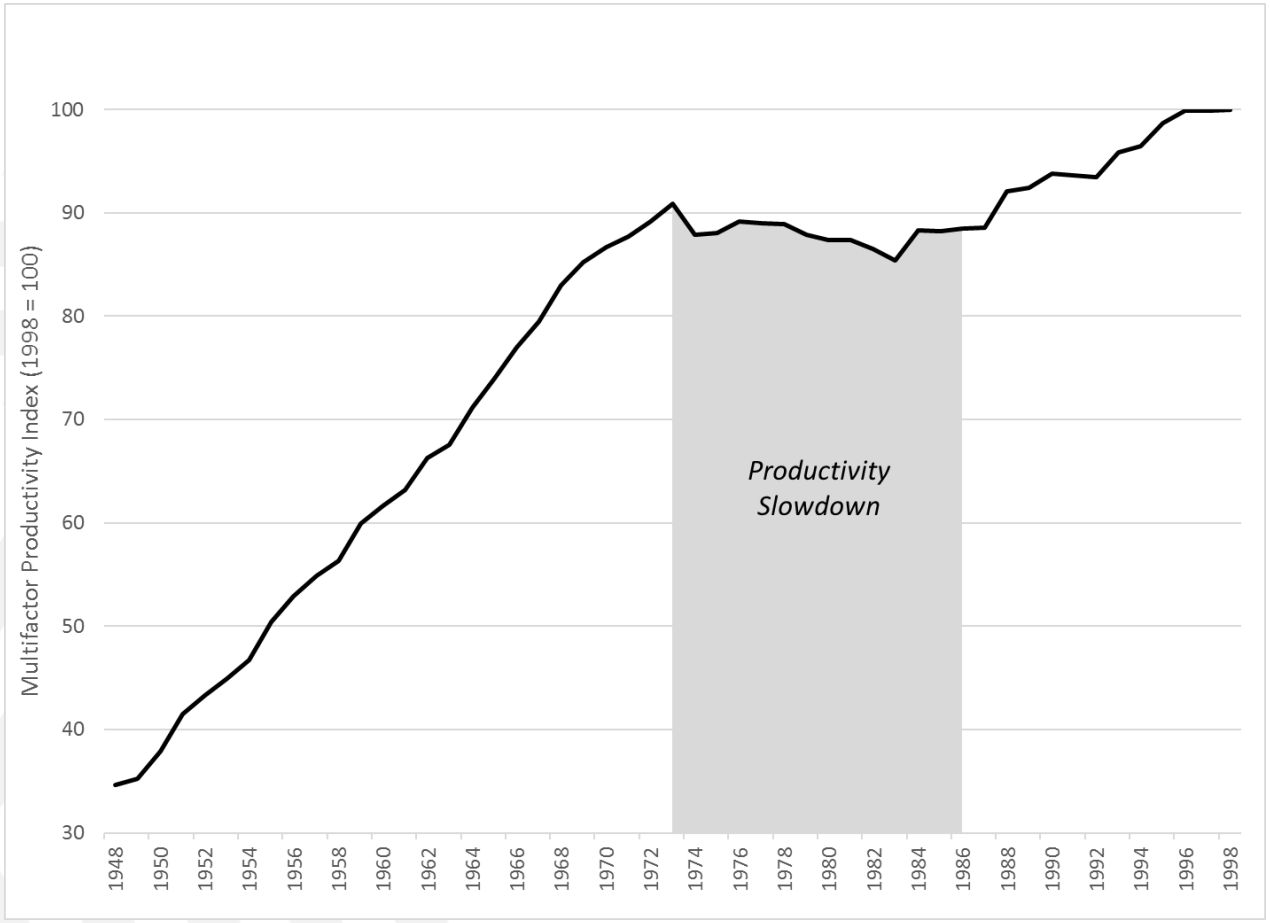
Indicators of Financial Attrition 1931-2014

	Average Annual Electricity Use					GDPPI Inflation[2]		Summary Attrition Indicator
	Residential[1]		Commercial[1]		Average Growth Rate			
Multiyear Averages	Level	Growth Rate	Level	Growth Rate	[A]	Level	Growth Rate	[C]-[A]
1931-1940	723	5.45%	4,048	2.00%	3.73%	7.99	-1.59%	-5.31%
1941-1950	1,304	6.48%	6,485	5.08%	5.78%	11.37	5.26%	-0.52%
1951-1960	2,836	7.53%	12,062	6.29%	6.91%	16.04	2.42%	-4.49%
1961-1972	5,603	5.79%	31,230	8.79%	7.29%	20.35	2.98%	-4.32%
1973-1980	8,394	2.03%	50,576	2.53%	2.28%	34.74	7.18%	4.90%
1981-1986	8,820	0.12%	54,144	0.81%	0.46%	54.22	4.57%	4.11%
1987-1990	9,424	1.39%	60,211	2.29%	1.84%	63.32	3.33%	1.49%
1991-2000	10,061	1.15%	67,006	1.68%	1.41%	75.70	2.03%	0.62%
2001-2007	10,941	0.73%	74,224	0.64%	0.68%	89.83	2.47%	1.79%
2008-2014	11,059	-0.38%	75,311	-0.22%	-0.30%	103.53	1.60%	1.90%

[1] U.S. Department of Energy, Energy Information Administration, Form EIA-861, "Annual Electric Utility Report," and Form EIA-826, "Monthly Electric Utility Sales and Revenues Report with State Distributions," and EIA-0035, "Monthly Energy Review."
[2] Bureau of Economic Analysis, Table 1.4.4. Price Indexes for Gross Domestic Product, Gross Domestic Purchases, and Final Sales to Domestic Purchasers, Revised October 28, 2016.

>>> Key business conditions less favorable today than in "golden age" of COSR when it became a tradition
These conditions may worsen, and some utilities need high capex

Adverse Business Conditions Weaken Incentives Under COSR

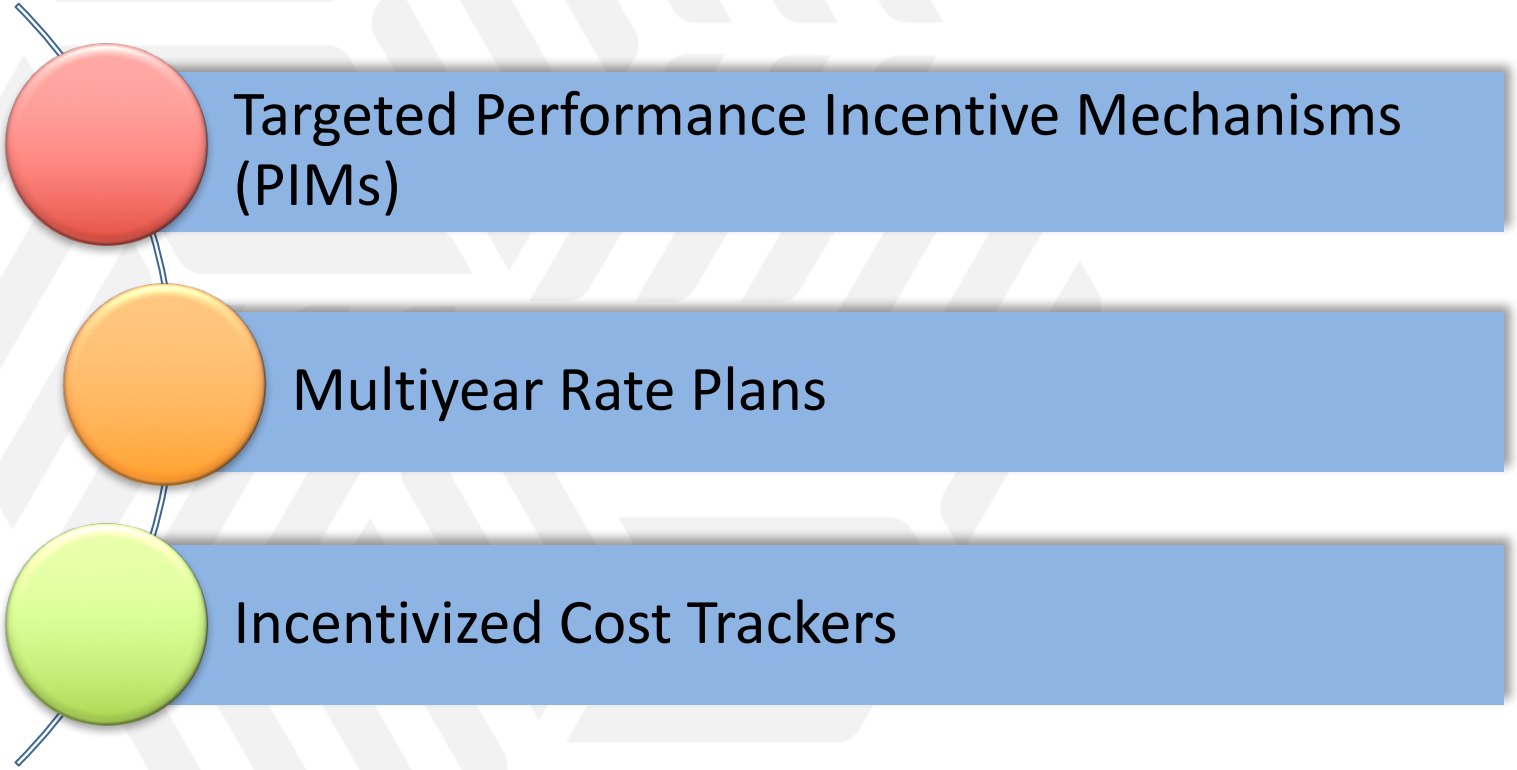


>>> Utility performance deteriorated in era of financial stress and frequent rate cases

Performance-Based Regulation

PBR: Regulation designed to improve utility performance with stronger incentives

3 established approaches (can be used in combination):



Multiyear Rate Plans

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Key Components

- Reduced rate case frequency (e.g., 4-5 year cycle)
- Attrition relief mechanism (ARM) provides automatic relief for cost pressures *based on forecast or business condition index with a productivity growth commitment — not a cost tracker or "formula rate"*
- Trackers for some costs (e.g., energy)
- PIMs link earnings to reliability and customer service quality

Optional Components

- Revenue decoupling
- Earnings sharing and off-ramp mechanisms
- Marketing flexibility (e.g., optional rates and services)
- Additional PIMs (e.g., demand-side management)
- Efficiency carryover mechanisms
- Integrated resource planning and distribution planning

MRP Rationale

Streamlined regulation

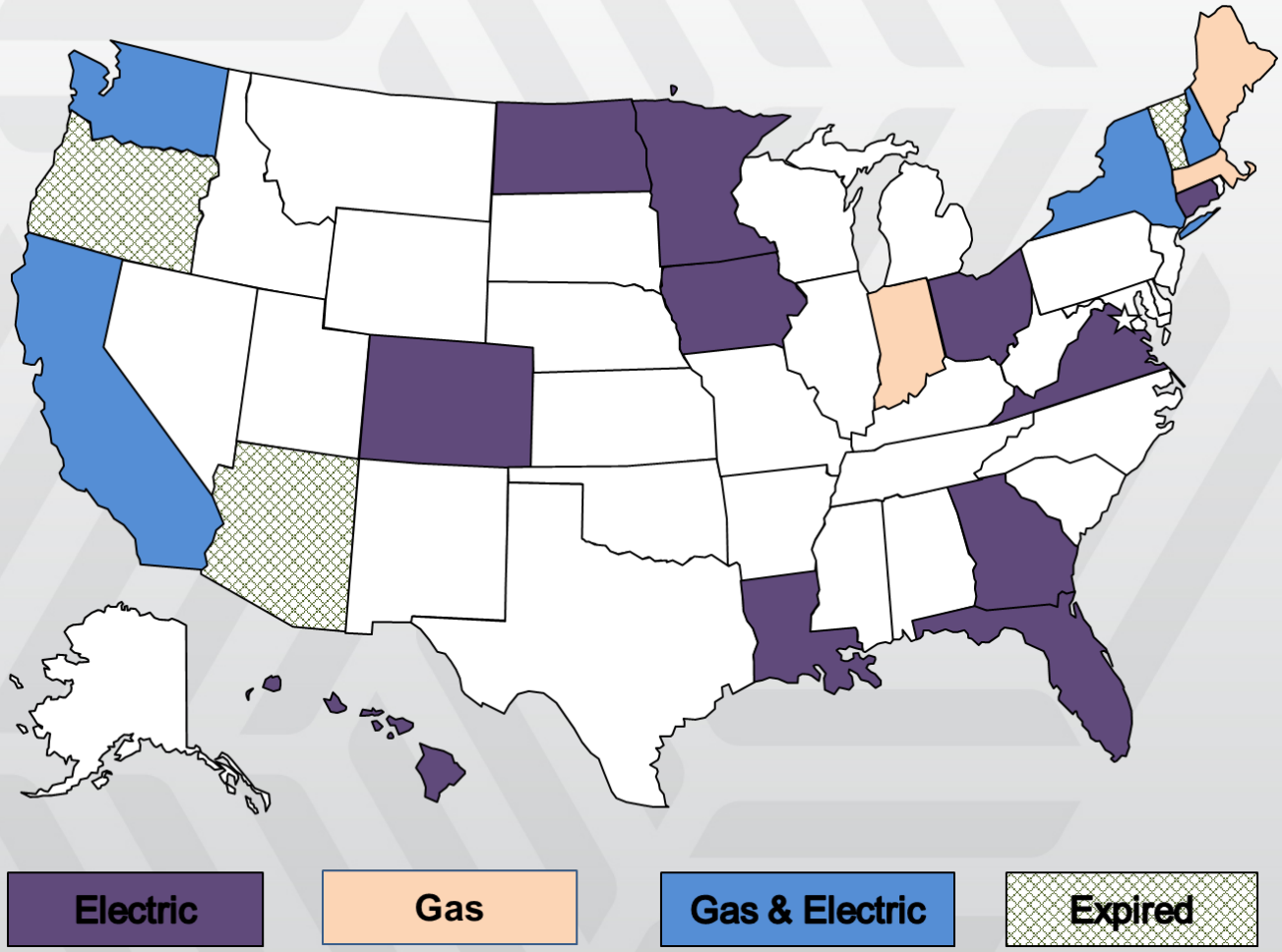
- Fewer, less overlapping rate cases

Improved operating performance

- Balanced, stronger performance incentives
- Increased marketing flexibility since less frequent rate cases reduce cost allocation chores and cross-subsidy concerns
- Fourth “leg” for the DSM “stool”
  1) Tracking of DSM expenses
  2) PIMs for conservation, peak load management, and “non-wire alternatives” to T&D capex
  3) Revenue decoupling
  4) MRPs can strengthen incentive to use DSM to contain load-related costs

MRP Precedents: U.S.

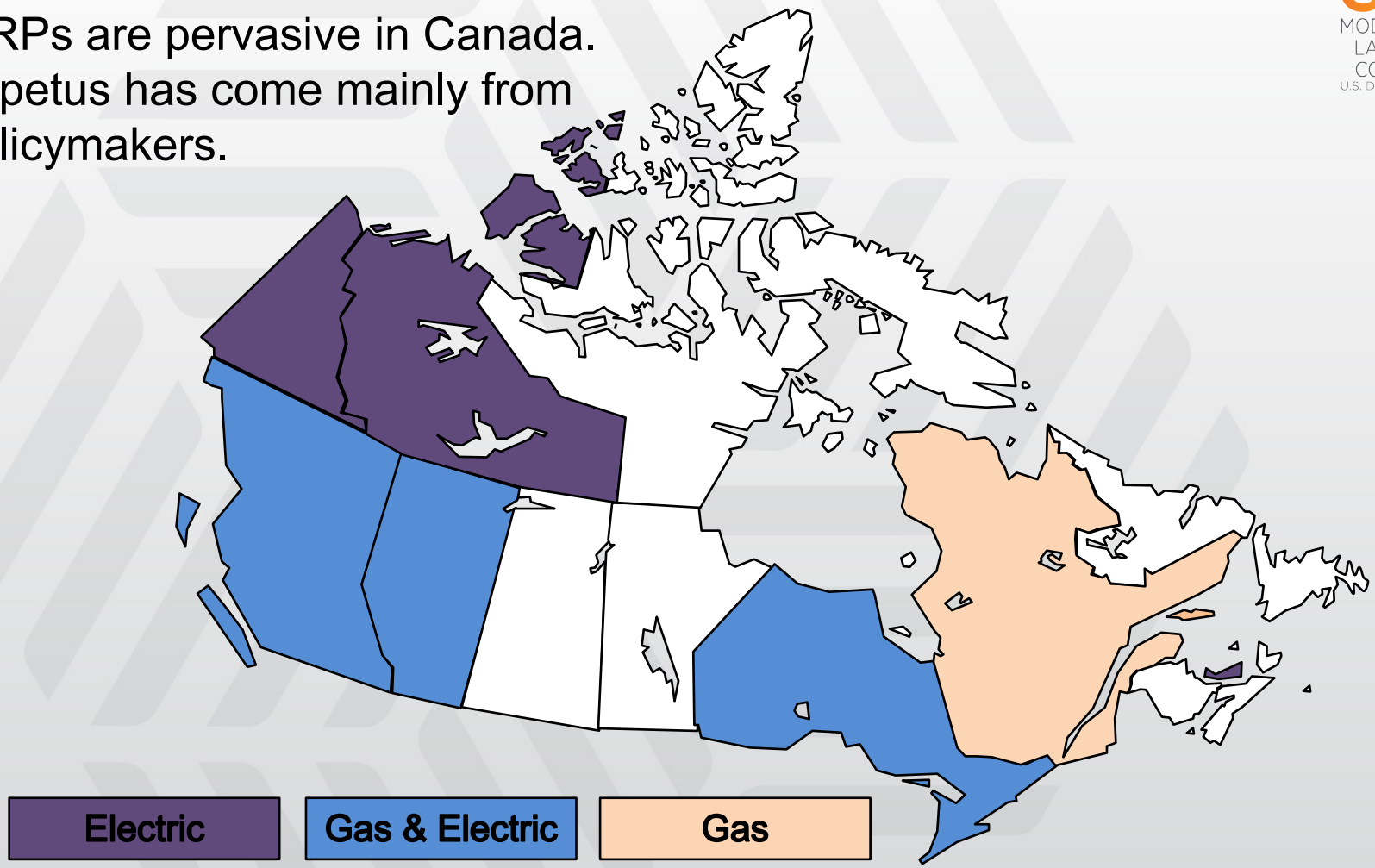
MRPs are now used in many states.



Source: Lowry, Makos, and Deason

Recent MRP Precedents: Canada

MRPs are pervasive in Canada. Impetus has come mainly from policymakers.



Source: Lowry, Makos, and Deason

Please use the chat box to send us your questions and comments any time during the webinar. We'll address as many questions as we can following the presentation.

The report is posted at https://emp.lbl.gov/publications/state-performance-based-regulation

ARM Design Options

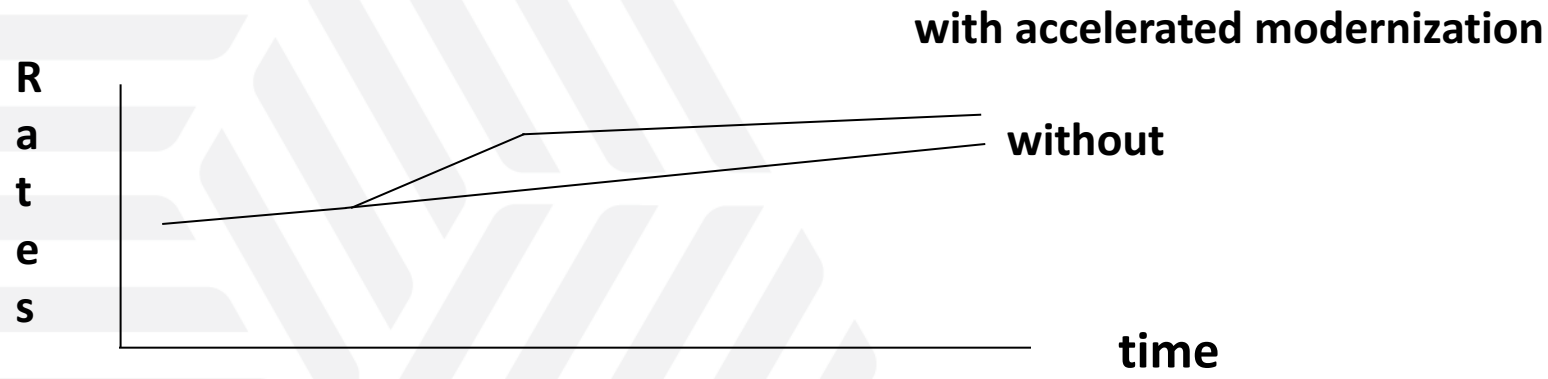
ARM design is biggest issue in most MRP proceedings

Several well-established approaches

- Indexing (e.g., growth Revenue = Inflation – X + growth Customers)
- Forecasting
- Hybrid
- Tracker/Freeze (e.g., rate freeze + generation capacity cost tracker)

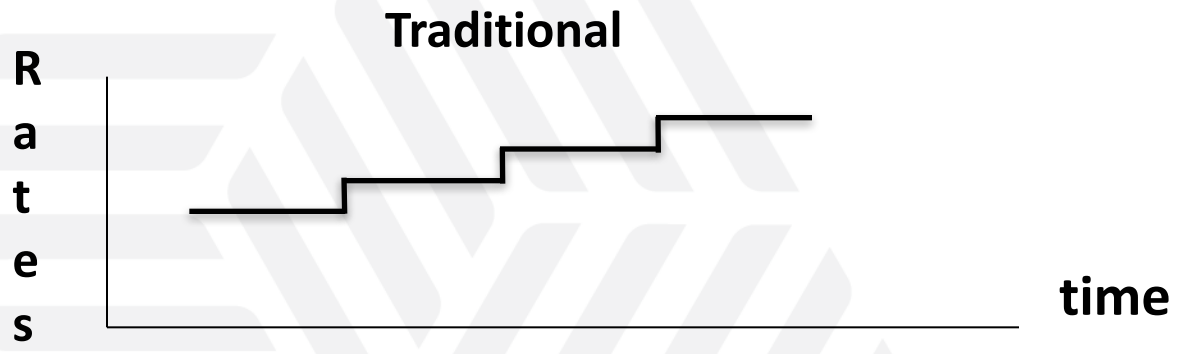
Different approaches make sense for different utilities and regulatory traditions

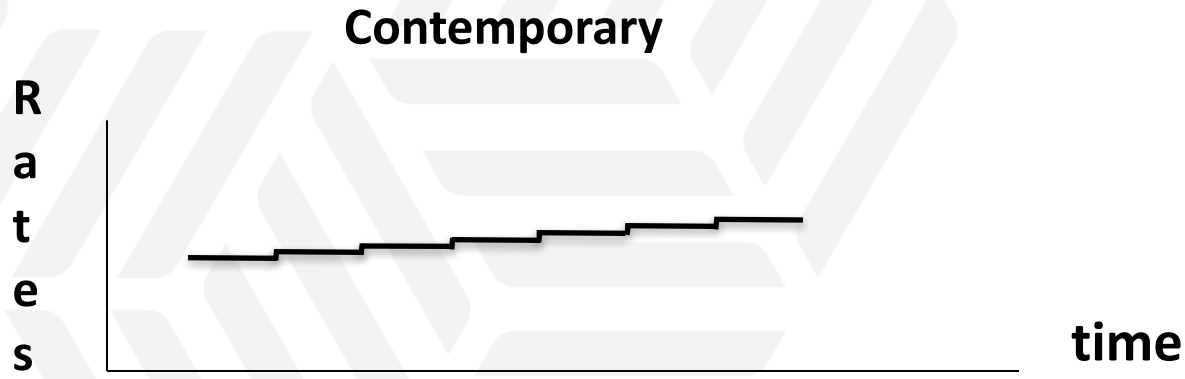
Required Rate Escalation: Utility Distribution Companies



>>> Agreeing on ARMs for rapidly modernizing utility distribution companies (UDCs) can be difficult.
This has slowed spread of MRPs in UDC regulation.
Integrated distribution planning can aid recognition of just and reasonable ARMs.

Require Rate Escalation: Vertically Integrated Utilities





>>> Agreeing on ARMs for VIEUs easier than in past

Case Study: Central Maine Power

Attrition Relief Mechanism:

growth Rates = growth GDPPI – X (X=1%)

Capital Cost Tracker: Automated metering infrastructure

Earning Sharing: Asymmetric sharing of surplus earnings

Plan term: 5 years (2009-2013)

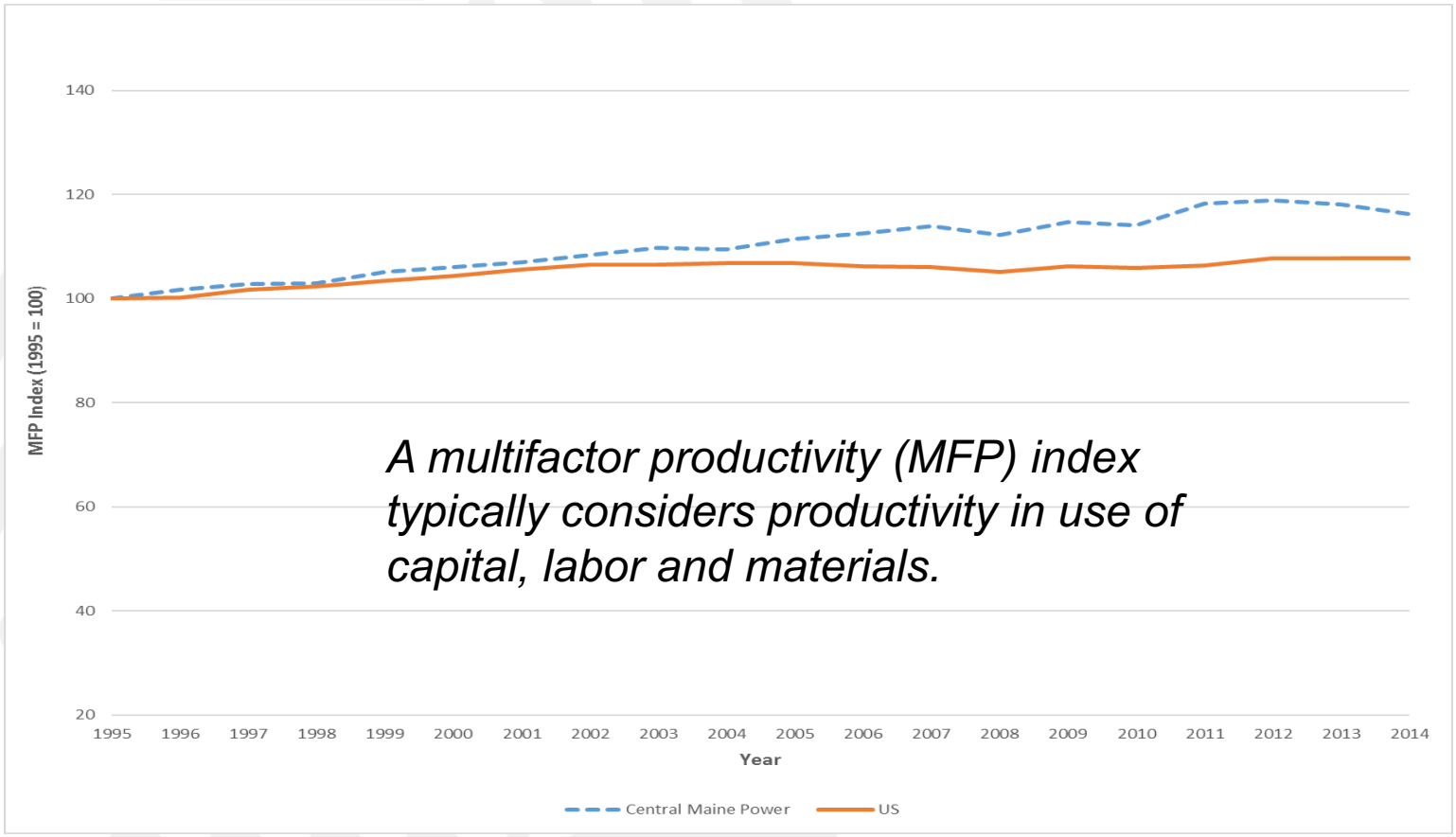
Service Quality: Multi-indicator penalty mechanism

Marketing Flexibility: Light-handed regulation of optional targeted rate schedules and rate discounts

Reference: Maine Public Utilities Commission, “ARP 2008 Settlement,” June 2008

Impact of MRPs on Performance

Distributor MFP Trend of Central Maine Power Under MRPs



Productivity growth typically faster for utilities under MRPs

Incentive Power Research

Incentive Power Model uses numerical analysis to compare cost performances of a hypothetical distributor under alternative regulatory systems

Key Results

- Multiyear rate plans can materially improve cost performance

  (e.g., cost 3-10% lower after 10 years)

- Benefit greater when alternative is frequent rate cases, expansive cost trackers or formula rates
- Transitional ("baby-step") MRPs do not greatly improve performance
- New approaches to MRP design (e.g., efficiency carryover mechanisms based on statistical benchmarking) can "turbocharge" performance

Conclusions

Regulators should proactively encourage good utility performance in an age when unfavorable business conditions can undermine performance

MRPs can streamline regulation and encourage better performance

COSR is still more popular than MRPs in the U.S. for various reasons

- COSR well established
- Many commissions prefer to address new attrition challenges with incremental reforms like revenue decoupling and new cost trackers
- Sometimes hard to design MRPs that generate stronger incentives than COSR without undue risk
- MRPs more easily address some business conditions (e.g., brisk input price inflation and declining average use) than others (e.g., high capex)
- MRPs can invite strategic behavior, and some plan design issues are controversial
- Commission staff and consumer advocates may lack expertise and resources to secure good outcomes
- Utilities may make more money (or the same money more easily) with frequent rate cases and more expansive cost trackers

Conclusions (cont'd)

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Use of MRPs in U.S. regulation expected to grow in coming years

Use of MRPs already growing for vertically integrated electric utilities

Key business conditions (e.g., inflation and DER penetration) may worsen, triggering more rate cases and expansive cost trackers

Utilities need better performance in face of mounting competition

Streamlined regulation is valued in an era of major generic issues

Increasing need for marketing flexibility, which MRPs facilitate

- Special contracts and economic development rates for large-load customers
- Green power options
- Time of use pricing and other smart grid-enabled options

MRPs have been widely used in other utility industries facing mounting competition (e.g., telecommunications)

Continued innovation in MRP design is producing better approaches; late adapters will benefit

- Handling of capex surges
- Efficiency carryover mechanisms that strengthen incentives and promote customer benefits

Please use the chat box to send us your questions and comments.

The report is posted at https://emp.lbl.gov/publications/state-performance-based-regulation

Additional Slides

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Regulators Acknowledge Incentive Problems

Limits of COSR have been acknowledged by regulators who embrace MRPs

> This initiative proceeds from the assumption that rate-base rate of return regulation offers few incentives to improve efficiency, and produces incentives for regulated companies to maximize costs and inefficiently allocate resources…. Regulators … must critically analyze in detail management judgments and decisions that, in competitive markets and under other forms of regulation, are made in response to market signals and economic incentives. The role of the regulator in this environment is limited to second guessing…The Commission is seeking a better way to carry out its mandate

Alberta Utilities Commission, "AUC letter of February 26, 2010," pages 1-2, Exhibit 1.01 in Proceeding 566.

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Lead Author Contact Information

Mark Newton Lowry, PhD

President

Pacific Economics Group (PEG) Research LLC

www.pacificeconomicsgroup.com

44 East Mifflin St., Suite 601, Madison, WI
608-257-1522

mnlowry@pacificeconomicsgroup.com

Project Manager and Technical Editor

Lisa Schwartz

Electricity Markets and Policy Group

Energy Analysis and Environmental Impacts Division

Lawrence Berkeley National Laboratory

(510) 486-6315

lcschwartz@lbl.gov

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